

**Model CD-400B
CD-4
Disc Demodulator**

Handbook of Instructions

marantz®

We Sounded Better

marantz®

Model CD-400B
CD-4
Disc Demodulator

MARANTZ CO., INC. • P.O. BOX 99 • SUN VALLEY, CALIFORNIA • 91352
A WHOLLY-OWNED SUBSIDIARY OF SUPERSCOPE INC., SUN VALLEY, CALIFORNIA 91352

We sound better.

WARRANTY

Marantz Company, Inc., proudly warrants your Marantz product to be free of manufacturing defects in material and workmanship as follows:

From date of purchase

Electronic Components and Receivers	PARTS - 3 years LABOR - 3 years
Headphones	PARTS - 3 years LABOR - 3 years
4-Channel Remote Control	PARTS - 3 years LABOR - 3 years
Plug-in Matrix Decoders	PARTS - 3 years LABOR - 3 years
Speakers and Cabinets	PARTS - 5 years LABOR - 5 years

TO VALIDATE YOUR WARRANTY, YOU MUST FILL OUT AND MAIL THE WARRANTY REGISTRATION CARD TO MARANTZ COMPANY, INC., P. O. BOX 99, SUN VALLEY, CALIFORNIA 91352, WITHIN TEN DAYS FOLLOWING THE DATE OF PURCHASE.

For Warranty repair, send this product to Marantz Company, Inc., 8150 Vineland Avenue, Sun Valley, California 91352, or to an AUTHORIZED Marantz Service Station. All shipping charges must be prepaid, Marantz will pay return shipping charges to any designated point within the United States.

This Warranty is void if the serial number has been altered or removed; if the product is modified or repaired in any manner which Marantz believes may affect the reliability of the product; if the product is not operated in accordance with the instruction manual.

Marantz shall have no liability whatsoever for consequential damages. The sole responsibility of Marantz Company, Inc., under this Warranty shall be limited to the repair of the product, or replacement thereof, in the sole discretion of Marantz Company, Inc.

EXCEPT TO THE EXTENT THAT APPLICABLE LAW PRECLUDES A DISCLAIMER OF WARRANTY, THERE IS NO IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS WITH RESPECT TO THIS PRODUCT, NOR ARE THERE ANY OTHER WARRANTIES WHICH EXTEND BEYOND THE PROVISIONS OF THIS WARRANTY.

8150 Vineland Avenue, Sun Valley, California 91352

REGISTRATION FOR MARANTZ 3-YEAR GOLDEN WARRANTY

Model Purchased _____

Date of Purchase _____

Place of Purchase _____

Address _____ City _____ State _____

Serial Number _____

PURCHASER'S RECORD ►

AC Line Operation

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

The above information becomes your permanent record of a valuable purchase. It should be promptly filled in at the same time that you fill in and mail the warranty registration reply card to Marantz. This information provides a valuable insurance record and must also be referred to should you have any correspondence with Marantz.

FOREWORD

To obtain optimum performance and enjoyment from the Model CD-400B, please study these instructions and follow the step-by-step procedures carefully.

This manual is divided into two parts. The first covers installation and operation in simple, non-technical language. The second describes the Model CD-400B in more technical detail.

For quick identification of the controls and connections, references to these are printed in **BOLD-FACE TYPE**.

GENERAL DESCRIPTION

Your Marantz Model CD-400B is a simple to operate demodulator for obtaining four discrete channels from CD-4 records. The Model CD-400B incorporates an Automatic Noise Reduction Circuit to minimize record noise without affecting frequency response, and an automatic 30 kHz carrier level control which selects the optimum carrier level for the cartridge being used. Non-CD-4 records may also be played through the CD-400B without affecting their performance. The CD-400B's controls do not have to be adjusted to play non-CD-4 records. When CD-4 records are played and the **MODE** pushswitch is in the **4 CH AUTO** position, the **RADAR** indicator will illuminate and the record will automatically be demodulated into four discrete channels.

AFTER UNPACKING

It is advisable to retain all original packing material to prevent damage should you wish to transport or ship the Demodulator (refer to page 8 for repacking and shipping instructions).

Please inspect your CD-400B carefully for any signs of shipping damage. Our very strict quality control and professional pride ensure that each CD-400B left the factory in perfect condition. If the unit is damaged or fails to operate, immediately notify your dealer. If the unit was shipped to you directly, notify the transportation company without delay. Only you, the consignee,

may institute a claim against the carrier for shipping damage. Save the carton and all packing material as evidence of damage for their inspection. Should assistance be required, the Marantz Company will cooperate fully in assisting your claim.

Please fill out and mail the Warranty Registration Card as soon as possible. The Marantz 3-year Golden Warranty will not go into effect until the Marantz Company receives the registration card, which was packed in the carton with your Model CD-400B.

TABLE OF CONTENTS

Connecting the CD-400B	2
Adjustments	2
Front Panel Features	4
Power Indicator	4
Power Switch	4
Selector Switch	4
Mode Switch	4
Rear Panel Features	5
2 CH Direct Out Switch and Jacks	5
Phono Input Jacks	5
Aux Input Jacks	5
4 CH Out Jacks	5
Chassis Ground	5
Separation Controls	5
Line Cord	5
Operation Notes	6
Functional Description	6
General Specifications	8
Service Notes	8
Repairs	8

LIST OF ILLUSTRATIONS

1. Connection Diagram	3
2. Front Panel Switches	4
3. Rear Panel Connection Facilities and Controls	5
4. Cartridge Mounting	6
5. Functional Block Diagram	7
6. Packing Instructions	8

CONNECTING THE CD-400B

Turn off the Model CD-400B and any equipment that will be connected to it before making any connections. The CD-400B must be used with a turntable or changer equipped with a cartridge designed for CD-4 records.

1. Connect the turntable or changer to the rear panel of the CD-400B with the special audio cables recommended by the cartridge manufacturer. Using any other cable may seriously degrade the performance of the CD-400B.

TURNTABLE/CHANGER	CD-400B
LEFT OUTPUT	to LEFT PHONO
RIGHT OUTPUT	to RIGHT PHONO
GROUNDING WIRE	to CHASSIS GROUND

2. Using standard shielded audio cables with phono plugs make the following connections.

4-CHANNEL AMPLIFIER	CD-400B
FRONT CD-4/AUX L	to 4 CHANNEL OUT FRONT L
FRONT CD-4/AUX R	to 4 CHANNEL OUT FRONT R
REAR CD-4/AUX L	to 4 CHANNEL OUT REAR L
REAR CD-4/AUX R	to 4 CHANNEL OUT REAR R
PHONO IN LEFT	to 2 CHANNEL DIRECT OUT LEFT
PHONO IN RIGHT	to 2 CHANNEL DIRECT OUT RIGHT

3. A discrete 4-channel playback device (Q-8 cartridge player, 4-channel discrete reel-to-reel tape deck, etc.) may be connected to the CD-400B using standard shielded audio cables with phono plugs as follows:

DISCRETE 4-CHANNEL PLAYBACK DEVICE	CD-400B
LEFT FRONT or L F or CHANNEL 1 or TRACK 1	to FRONT AUX L
LEFT REAR or L R or CHANNEL 2 or TRACK 2	to REAR AUX L
RIGHT FRONT or R F or CHANNEL 3 or TRACK 3	to FRONT AUX R
RIGHT REAR or R R or CHANNEL 4 or TRACK 4	to REAR AUX R

4. Set the controls on the 4-channel amplifier in accordance with the manufacturer's instructions.
5. Set the CD-400B's front panel **MODE** push-switch to the **4 CH AUTO** position.
6. Set the front panel **SELECTOR** pushswitch to the **PHONO** position.
7. Set the rear panel **DIRECT OUT** switch to **OFF**.
8. Connect the AC line cord to an AC outlet providing the AC voltage and frequency specified on the rear panel serial number nameplate. Turn on the turntable, CD-400B and 4-channel amplifier.

ADJUSTMENTS

Before the Model CD-400B can properly demodulate CD-4 records, a few simple adjustments must be made.

The following adjustment procedure should be performed whenever a new cartridge or stylus is installed.

1. Decrease the front channel volume on the main amplifier so that only the rear speakers can be heard.
 2. Play the CD-4 **ADJUSTMENT TONE** band of the test record.
 3. Adjust the rear panel **LEFT SEPARATION CONTROL** for minimum sound level from the left rear speaker.
 4. Play the CD-4 **ADJUSTMENT TONE** band of the test record.
 5. Adjust the rear panel **RIGHT SEPARATION CONTROL** for minimum sound from the right rear speaker.
 6. Play the **CHANNEL BALANCE ADJUSTMENT TONE** band of the test record and using the **BALANCE CONTROLS** of the main amplifier, adjust the relative sound level of each of the four channels to achieve a satisfactory four channel balance.
- NOTE:** The CD-400B contains a special circuit to control the lock range of the carrier detector and thereby optimize its performance. No adjustments for carrier level (band 2 of the supplied test record)

are therefore necessary. However, in extreme cases of badly worn discs and stylus or poorly designed cartridges, the carrier level output may be outside the range of automatic compensation, caus-

ing distorted sound and intermittent 4-channel operation. If this is the case, either a new disc, a new stylus, or a better cartridge must be secured.

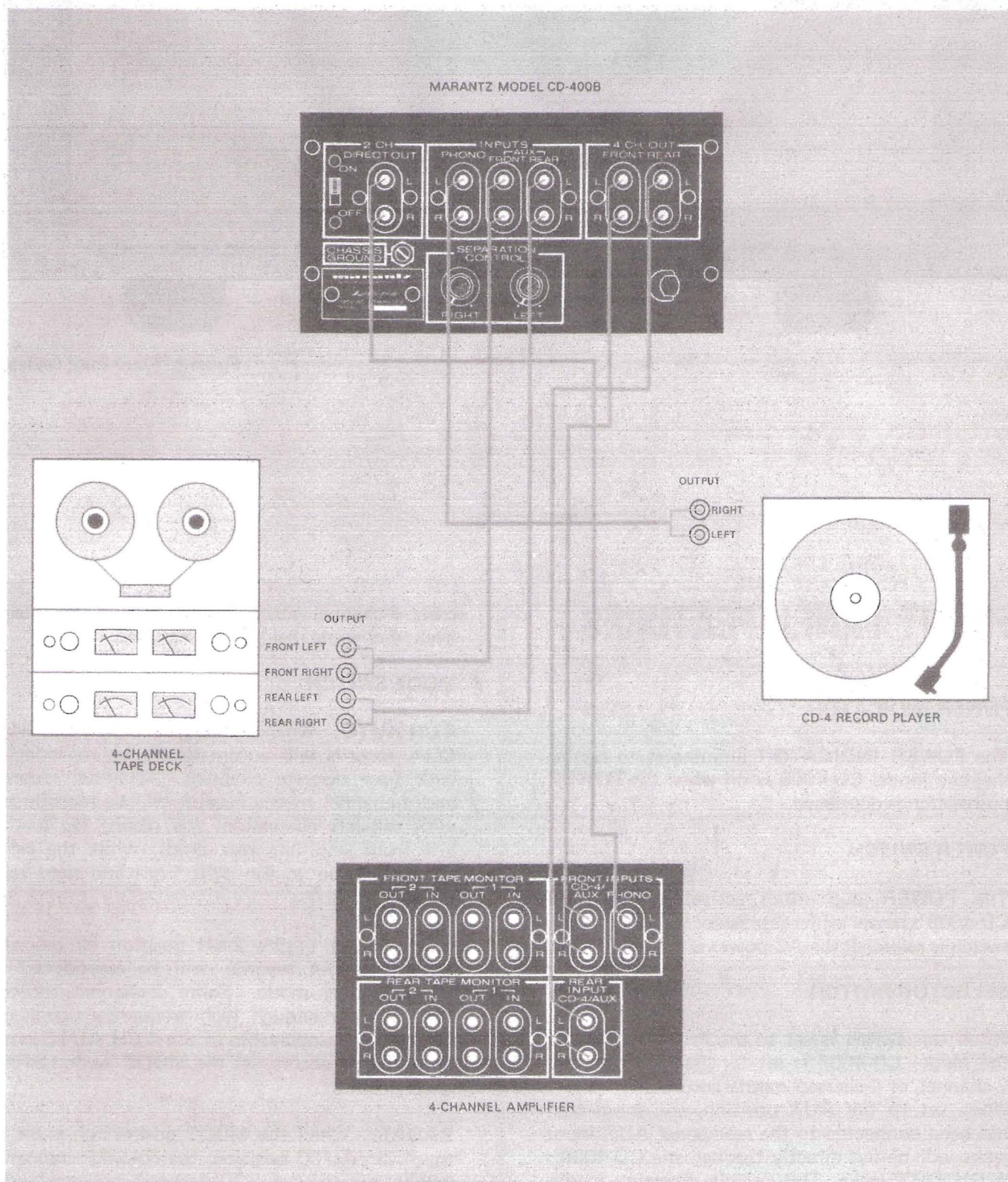




Figure 2. Front Panel Switches

FRONT PANEL FEATURES

POWER INDICATOR

The **POWER INDICATOR** illuminates to signify that the Model CD-400B is on when the **POWER** pushswitch is depressed.

POWER SWITCH

The **POWER** pushswitch activates the Model CD-400B's power when depressed. When the pushswitch is released, the AC power is off.

SELECTOR SWITCH

When this switch is set to the **PHONO** position, the Model CD-400B is set for listening to CD-4, 2-channel, or 4-channel matrix records. When set to the **AUX** position, any input that has been connected to the rear panel **AUX** input jacks will be fed directly through the CD-400B's **4 CH OUT** jacks. This permits listening to dis-

crete 4-channel sources such as an 8-track tape deck, 4-channel reel-to-reel deck, etc.

MODE SWITCH

4 CH AUTO: When in the **4 CH AUTO** position, CD-4 records will automatically be reproduced with four discrete channels. 2-channel records and 4-channel matrix records will be reproduced with the left channel of the record fed to the left front and left rear amps, while the right channel is fed to the right front and right rear amps.

2 CH: When in the **2 CH** position all records, including CD-4 records, will be reproduced in the 2-channel mode. Some 2-channel records may contain enough high frequency signals to render them unplayable in the **4 CH AUTO** position. If this occurs, set the **MODE** switch to the **2 CH** position.

RADAR: When the **MODE** pushswitch is set to the **4 CH AUTO** position, the **RADAR** indicator will illuminate when a CD-4 record is being played.

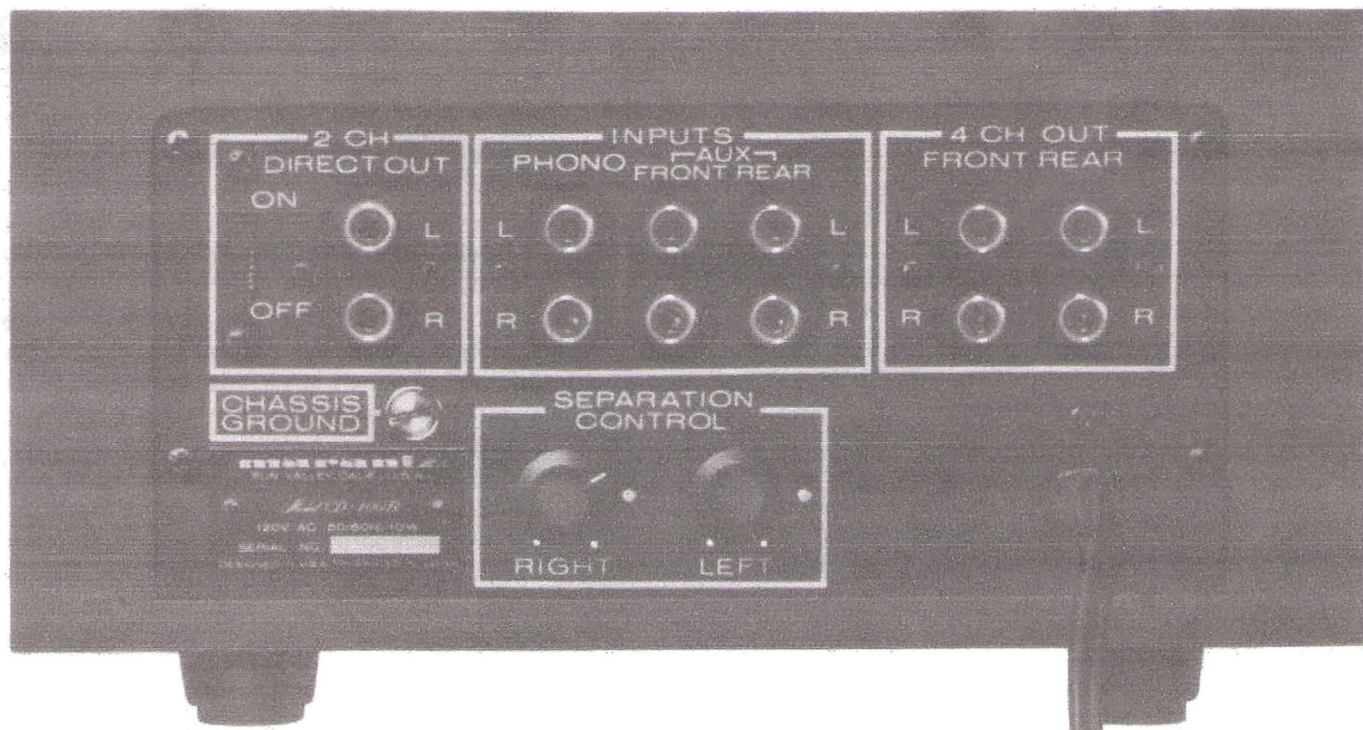


Figure 3. Rear Panel Connection Facilities and Controls

REAR PANEL FEATURES

2 CH DIRECT OUT SWITCH AND JACKS

When set to the **ON** position, the PHONO INPUT signal is fed directly to the **DIRECT OUT** jacks. These jacks may be connected to the PHONO IN jacks of an amplifier as an alternate method for playing stereo or 4-channel matrix records. When set to the **OFF** position, the PHONO INPUT signal is processed by the CD-400B.

PHONO INPUT JACKS

These jacks are intended to be used with a CD-4 magnetic cartridge.

AUX INPUT JACKS

These jacks are for connecting any 4-channel high level source. Manufacturers may use different terminology for the four channels, and care should be exercised to avoid confusing the channel connections. The following are examples of 4-channel nomenclature equivalents:

LEFT FRONT	LF-LF- CHANNEL 1 -TRACK 1
LEFT REAR	LR-LB- CHANNEL 2 -TRACK 2
RIGHT FRONT	RF-RF- CHANNEL 3 -TRACK 3
RIGHT REAR	RR-RB- CHANNEL 4 -TRACK 4

4 CH OUT JACKS

These high level output jacks should be connected to the AUX IN or CD-4/AUX jacks on a 4-channel console amplifier or pre-amplifier.

CHASSIS GROUND

This binding post is for the connection of the ground wire from the turntable or record changer.

SEPARATION CONTROLS

The **LEFT** and **RIGHT SEPARATION CONTROLS** adjust channel separation between the left front and left rear and right front and right rear speakers respectively. See adjustment section.

LINE CORD

Connect the AC line cord to an AC outlet providing the AC voltage and frequency specified on the rear panel serial number nameplate.

OPERATION NOTES

1. Separation Adjustment

Once the separation controls are set they should not need readjustment until the cartridge and/or stylus is replaced.

2. Anti-Skating

For optimum results with the CD-400B, the anti-skating force on the turntable should be carefully adjusted in accordance with the manufacturer's instructions.

3. Cartridges

Only a magnetic cartridge designed for CD-4 reproduction will provide usable playback results. The cartridge must be mounted perpendicular to the record surface. See Figure 4. The stylus must be kept clean. Consult your dealer for cleaning accessories.

4. Turntable Leads

Only coaxial audio cables designed for CD-4 use should be used. Consult your dealer for the proper type.

5. TV Interference

A TV set located near the CD-4 record player may interfere with playback of CD-4 discs. If this should occur, either turn off the TV or move the record player away from the TV.

6. Record Care

CD-4 records require cleanliness. Keep them away from dust, dirt and cigarette smoke. Clean them with a high quality record cleaning device before playing and before storing. Do not use solvents or water because they will increase noise on the discs.

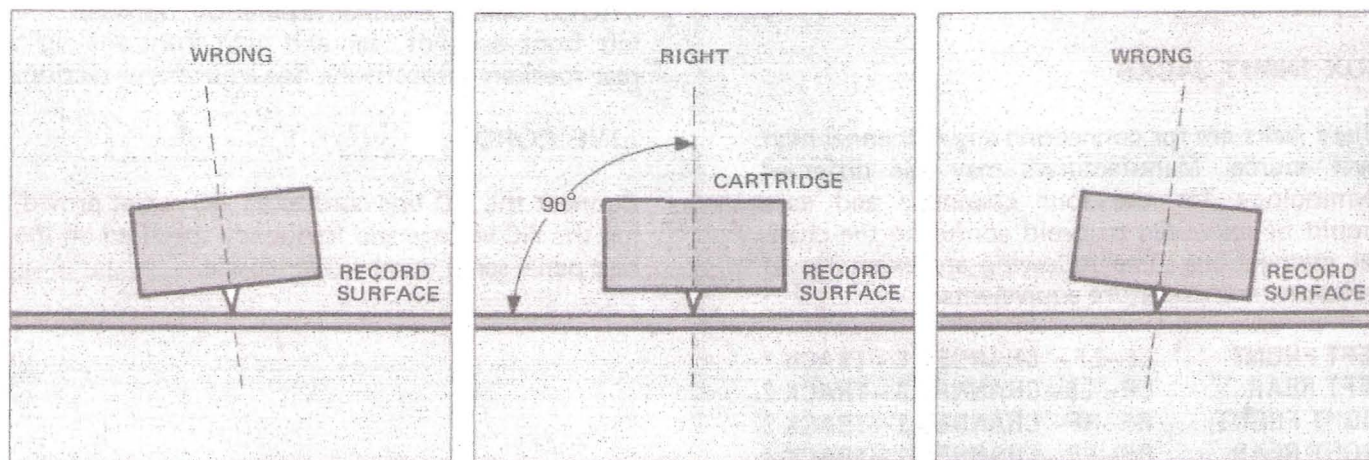
FUNCTIONAL DESCRIPTION

In the CD-4 record two signals are superimposed on each wall of the same groove. One is the SUM SIGNAL $L_F + L_B$ (or $R_F + R_B$). The other is a 30 KHz carrier modulated in frequency by the DIFFERENCE SIGNAL $L_F - L_B$ (or $R_F - R_B$).

Referring to the block diagram of Figure 5, the composite signal picked up by the phone cartridge is first passed through a circuit which provides standard RIAA equalization. Its output signal is split into two different paths: One path goes through a Low Pass filter that lets only the sum signal through to the mixing circuit while stopping the carrier. A separation adjustment is included in this path to compensate for the variation in output level from different cartridges. The other path takes the signal through a High Pass Filter which blocks the sum signal, but allows the modulated high frequency carrier to be presented to the FM Detector, after amplification to the proper level. There, the difference signal is recovered (detected) by means of a low distortion Phase Locked Loop circuit. The 30 kHz level is automatically adjusted to suit different types of cartridges and set-up conditions.

The Low Pass filter that follows the FM detector suppresses any vestiges of the high frequency carrier, leaving only the original difference signal. In recording, the frequency response of the difference signal is modified to improve signal-to-noise ratio and crosstalk. The circuits labelled De-emphasis and ANRS in the CD-400B block diagram are intended to restore the original response of

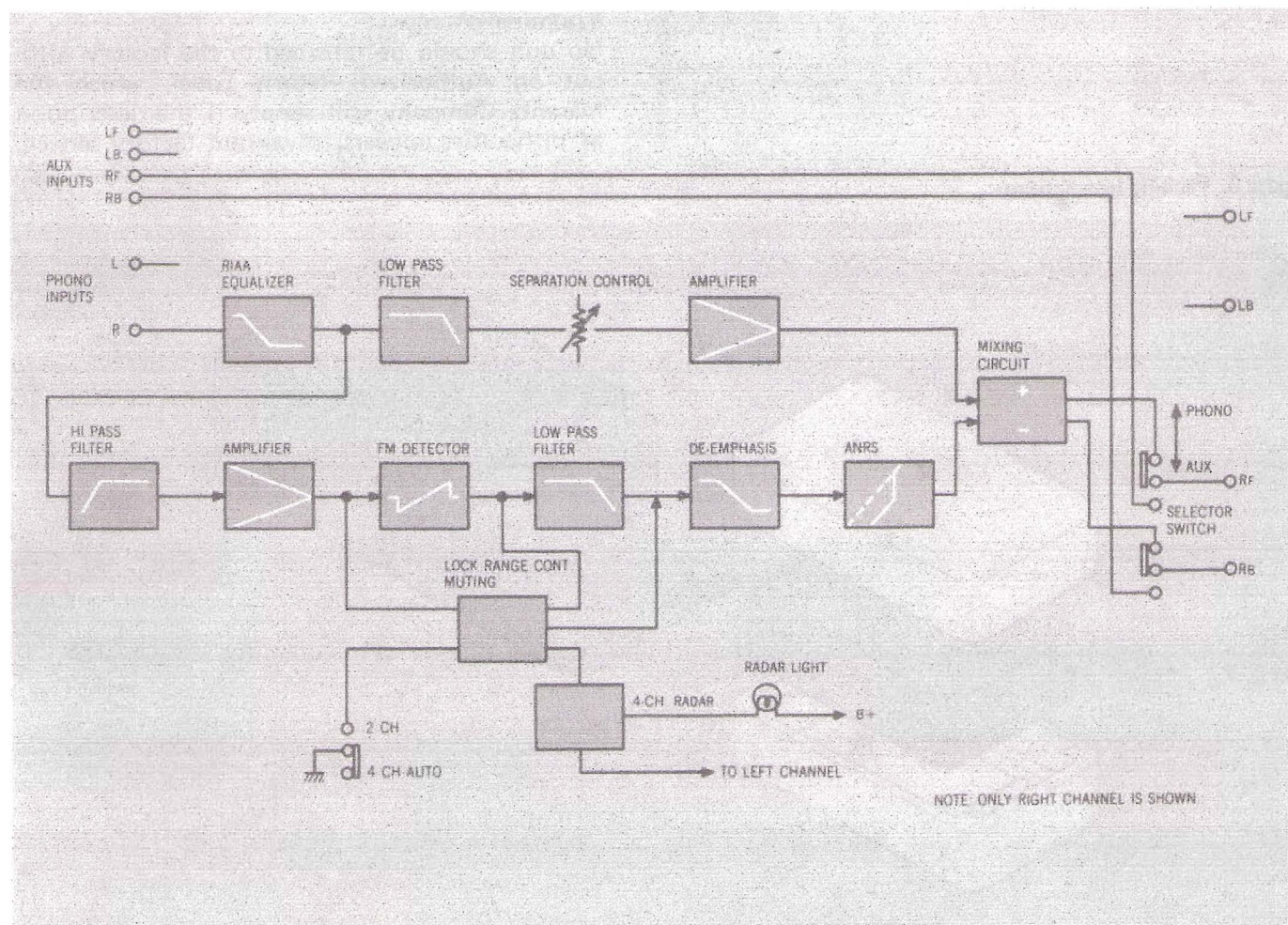
Figure 4. Cartridge Mounting



the difference signal while at the same time reducing noise and crosstalk. When a CD-4 record is played, the Muting/4-CH Radar circuit senses the presence of the 30 kHz carrier and, by means of its special circuit, turns on the Radar light and opens the path for the difference signals. If a regular stereo record is played, the same Muting circuit shuts off the Radar light and the difference signal path, so that only the sum signal (which contains all the information necessary for stereo reproduction) is allowed to reach the output. This same function can be manually performed with an external pushbutton.

Once the sum and difference signals have been recovered, the rest is simple arithmetic. The Mixing Circuit adds and subtracts these signals yielding the discrete channels. For example: $(L_F + L_B) + (L_F - L_B) = 2 L_F$. The other three channels are derived in a similar manner.

Figure 5. Functional Block Diagram



GENERAL SPECIFICATIONS

Power Requirements . . 120V AC, 50 to 60Hz
Power Consumption 10 Watts
Dimensions Width: 8-1/4 inches
 Height: 3-7/8 inches
 Depth: 12-3/4 inches
Weight Unit Alone: 7.37 lbs.
 Shipping: 8.70 lbs.

SERVICE NOTES

REPAIRS

Only the most competent and qualified service technicians should be allowed to service the Marantz Model CD-400B.

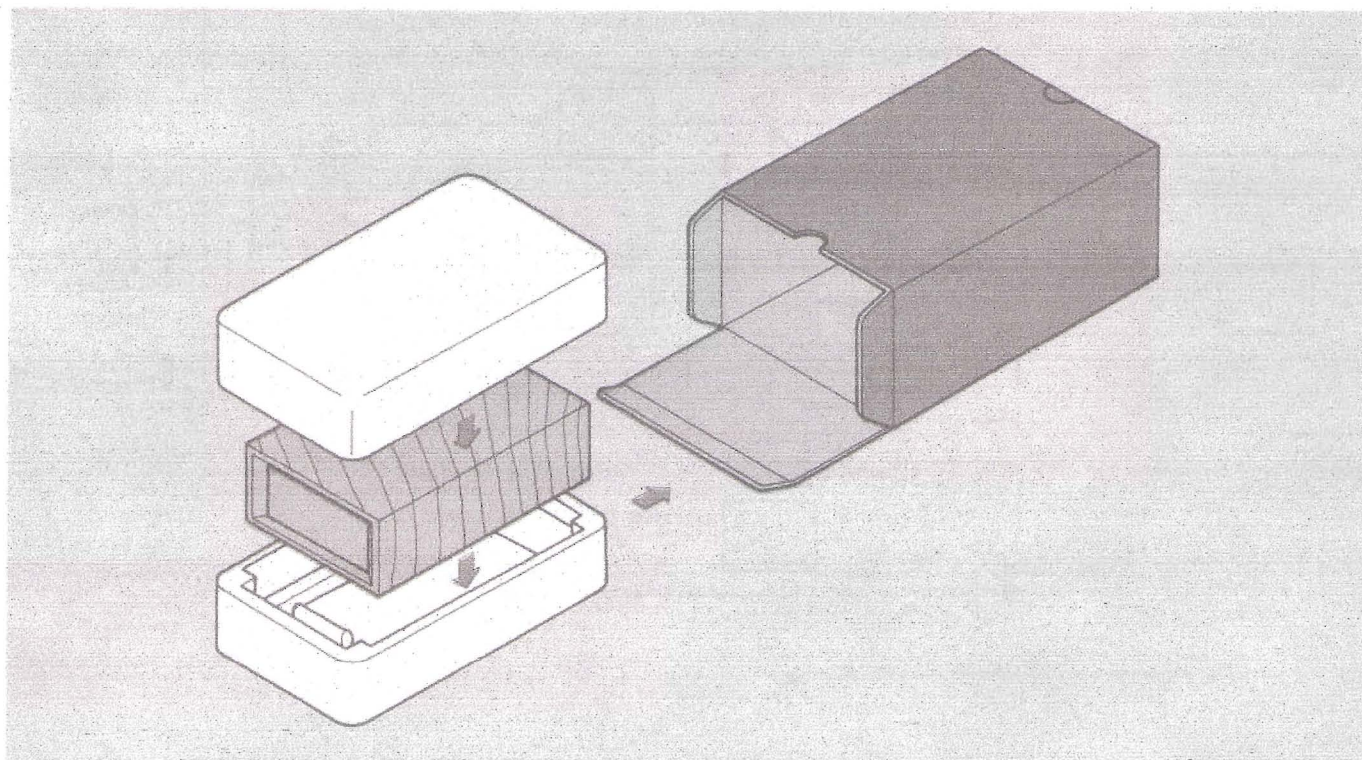
The Marantz Company and its warranty station personnel have the knowledge and special equipment needed for the repair and calibration of this precision instrument.

In the event of difficulty, write directly to the factory (to the attention of the **Technical Service Department**) for the name and address of the nearest Marantz warranty or authorized service station. Please include the model and serial number of the unit together with a description of the problem.

If it should ever be necessary to ship the unit to the factory or authorized service station, pack the unit carefully using the original packing material. If the packing material has been discarded, lost or damaged, write to the factory (to the attention of the **Technical Service Department**) for new packing material. Carton, fillers and packing instructions will be returned to you at a nominal charge.

No unit should be returned to the factory without an Authorized Return Label, which the Marantz Company will supply if the description of difficulties appears to warrant factory service.

Figure 6. Packing Instructions



Please pack the CD-400B as illustrated in Figure 6.

Insure the Model CD-400B for its full value. Make sure that your correct return address is on the shipping label. Ship via a reputable carrier. (DO NOT USE PARCEL POST.) Be sure to obtain a receipt from the carrier.

The Sound of Marantz

is the compelling warmth of a Stradivarius.

It is a dancing flute, a haughty bassoon

and the plaintive call of a lone French horn.

The Sound of Marantz is the sound of beauty,

and Marantz equipment is designed to bring you

the subtle joy of its delight.

Wonderful adventures in sound await you

when you discover that the Sound of Marantz

is the sound of music at its very best.



marantz